

**WHAT IS CLAIMED IS**

- 5        1. A vehicle frame structure having a front and a rear end, a pair of parallel spaced apart rails and a plurality of transversal support beams, wherein each transversal support beam is joined to each rail by means of an adherent substance.
- 10      2. A vehicle frame structure as claimed in claim 1, wherein each transversal support beam is joined to each rail by means of a joining member which joins each transversal support beam and each rail by means of an adherent substance.
- 15      3. A vehicle frame structure as claimed in claim 1, wherein each transversal support beam is joined to each rail by means of a joining member which joins each transversal support beam and each rail by means of an adherent substance and a bolt-nut assembly which helps to maintain the joining member in place while the adherent substance is fresh.
- 20      4. A vehicle frame structure as claimed in claim 1, wherein each transversal support beam is joined to each rail by means of a joining member which joins each transversal support beam and each rail by means of an adherent substance and wherein the joining member comprise a clamp joint.
- 25      5. A vehicle frame structure as claimed in claim 1, wherein each transversal support beam is joined to each rail by means of a joining member which joins each transversal support beam and each rail by means of an adherent substance and wherein the joining member comprise a clamp joint

further including a bolt-nut assembly which helps to maintain the clamp joint in place while the adherent substance is fresh..

6. A vehicle frame structure as claimed in claim 1, including an additional longitudinal and central rail joined to both lateral rails by means of one or more  
5 transversal support beams.

7. A vehicle frame structure as claimed in claim 1, wherein the front end attaching a suspension support structure.

8. A vehicle frame structure as claimed in claim 1 wherein the lateral rails each comprising a double rail having a main rail and a parallel secondary rail  
10 joined to the main rail.

9. A vehicle frame structure as claimed in claim 1 having five transversal support beams comprising a first, second and third transversal support beam, a gas tank transversal support beam and a transmission support beam.

10. A vehicle frame structure as claimed in claim 1, wherein each rail  
15 comprise an elongated tubular member having a circular cross section.

11. A vehicle frame structure as claimed in claim 1 having five transversal support beams comprising a first, second and third transversal support beam, a gas tank transversal support beam and a transmission support beam and further including a first and a second 1<sup>st</sup> box supports each welded to  
20 each rail between the gas tank transversal support beam and the third transversal support beam.

12. A vehicle frame structure as claimed in claim 1 having five transversal support beams comprising a first, second and third transversal support beam, a gas tank transversal support beam and a transmission support

beam and further including a first and a second 2<sup>nd</sup> box supports each welded to each rail between the second and third transversal support beam.

13. A vehicle frame structure as claimed in claim 1 having five transversal support beams comprising a first, second and third transversal support beam, a gas tank transversal support beam and a transmission support beam and further including a first and a second 3<sup>rd</sup> box supports each welded to each rail between the second and third transversal support beam.

14. A vehicle frame structure as claimed in claim 1 having five transversal support beams comprising a first, second and third transversal support beam, a gas tank transversal support beam and a transmission support beam and further including a first and a second 4<sup>th</sup> box supports each welded to each rail near an end of a main rail.

15. A vehicle frame structure as claimed in claim 1 having five transversal support beams comprising a first, second and third transversal support beam, a gas tank transversal support beam and a transmission support beam and further including a first and a second rear fender support welded to an end tip of a rail.

16. A vehicle frame structure as claimed in claim 1 having five transversal support beams comprising a first, second and third transversal support beam, a gas tank transversal support beam and a transmission support beam and further including a first and a second 3<sup>rd</sup> box supports each welded to each rail between the second and third transversal support beam and a first and a second shock absorber support , wherein the first shock absorber support is welded to a rail between the second and third transversal beams and the

second shock absorber is welded to an opposed rail between the second 3<sup>rd</sup> box support and the second transversal beam.

17. A vehicle frame structure having a front, rear, superior and an inferior end and an internal and an external side, comprising:

5           a first and a second spaced apart parallel double rails each having a first and a second end comprising

              a first and a second main rail each having a first and a second end corresponding to the front and rear of the vehicle frame respectively and a circular cross section;

10          a first and a second secondary rail each having a first and a second end corresponding to the front and rear of the vehicle frame respectively, and a circular cross section, wherein the second end is welded to the first end of a main rail;

15          a central rail having a first and a second end, and a central portion, located between the first and second double rail and linked to them by means of a first, second and third transversal support beam;

              a first transversal support beam having a first and a second end and a central "O" ring for receiving the cross section of the central rail and further including a first and a second half clamp at each end;

20          a first and a second rear spring support each including a first and a second half clamp, each closing a half clamp of the first transversal support beam forming a first and a second rear spring support "O" shaped ring for receiving and joining the cross section of a main rail by means of an adherent substance and thus joining both double bars;

a second transversal support beam having a first and a second end and a central "O" ring for receiving the cross section of the central rail central portion and further including a first and a second half clamp at each end;

- a first and a second rear axle auxiliary support each including a first and 5 a second half clamp, each closing a half clamp of the second transversal support beam forming a first and a second rear axle auxiliary support "O" shaped ring for receiving and joining the cross section of a main rail by means of an adherent substance and thus joining both double bars;

- a third transversal support beam having a first and a second end and a 10 central "O" ring for receiving the central rail cross section and further including a first and a second half clamp at each end;

- a first and a second front spring support each including a first and a second half clamp, each closing a half clamp of the third transversal support beam forming a first and a second front spring support "O" shaped ring for 15 receiving and joining the cross section of a main rail by means of an adherent substance, and thus joining both double bars;

a gas tank transversal support beam having a first and a second end, each including a pair of half clamps;

- a first and a second 2nd<sup>t</sup> cabin support, each including a pair of half 20 clamps, each pair closing a pair of half clamps of the gas tank transversal support beam, forming a 2nd<sup>t</sup> cabin support first and a second pair of "O" rings for receiving and joining the cross section of a main rail at approximately its half third quarter portion and the cross section of the secondary crossbar at approximately its central portion respectively by means of an adherent 25 substance, and thus joining both double bars;

- a transmission support beam having linking means;
- a first and a second 1<sup>st</sup> cabin support, and a cabin support linking member for each 1<sup>st</sup> cabin support, for linking each main and secondary crossbar, the transmission support beam and thus both double bars together;
- 5 and
- a front suspension support frame having a first and a second double rail receiving sections for joining the first end of the main and secondary rails and both double rails together and further including a first and a second impact beam receiving section, opposed to the first and second double rail receiving
- 10 sections.
18. A vehicle frame structure according to claim 17, wherein:
- the main rail has four equal length portions, a straight section beginning at the second end and finishing at approximately one quarter of the length of the main rail and a bent section slightly bent towards below and towards the
- 15 external side of the automotive frame, beginning at the end of the straight section and finishing at the first end of the main rail; and
- the secondary rail has four equal length portions, a first and a second end bent sections slightly bent towards below of the automotive frame, and each located at the first and second end of the secondary rail respectively, and
- 20 a central straight section.
19. A vehicle frame structure according to claim 18, wherein: the central "O" ring of the first transversal support beam receives the cross section of the central rail at its second end; the first and a second rear spring support "O" shaped ring receives the cross section of a main rail at its second; the central
- 25 "O" ring of the second transversal support beam receives the cross section of

the central rail at its central portion; the first and a second rear axle auxiliary support "O" shaped ring receives the cross section of a main rail at its first quarter portion; and the central "O" ring of the third transversal support beam receives the cross section of the central rail at its first end; the first and a  
5 second front spring support "O" shaped ring receives the cross section of a main rail at a central portion of its second bent section; the 2nd<sup>t</sup> cabin support first and a second pair of "O" rings receives the cross section of a main rail at an approximately half third quarter portion and the cross section of the secondary crossbar at a central portion respectively; and the first and a second 1<sup>st</sup> cabin  
10 support, and both cabin support linking members receives the cross section of a main rail and secondary rail at a last quarter portion.

20. A vehicle frame structure according to claim 17, wherein the first transversal support beam comprising a first and a second longitudinal and parallel elongated members, each slightly bent at a central portion towards  
15 below of the automotive frame and having a first and a second end, and joined at its central portion by means of a central "O" ring for receiving the second end of the central rail and by means of two half clamps each vertically oriented and opened to the external side of the automotive frame, joining the first and second end of the elongated members, and having a superior and inferior bolt receiving  
20 member.

21. A vehicle frame structure according to claim 20, wherein the first and a second rear spring support, each having a spring support element and a half clamp vertically oriented and opened to the internal side of the automotive frame, wherein the half clamp and the spring support are connected by means  
25 of a flat elongated piece and two curved elongated pieces each joined by one

of its end to an end of the half clamp and joined together by its opposite ends for joining the spring support element, and wherein each half clamp includes a superior and a inferior bolt receiving member, and closes the half clamps of the first transversal support beam in such way that each one of its bolt receiving members coincide and receive a bolt-nut assembly thus forming and "O" shaped ring for receiving and joining the cross section of a main rail by means of an adherent substance applied to the "O" shaped ring thus joining the second end of the main rails and the central rail at its second end.

22. A vehicle frame structure according to claim 17, wherein the second transversal support beam serves as a spare tire support, and comprises a first and a second longitudinal and parallel elongated member each slightly bent at its central portion towards below of the automotive frame and each having a first and a second end, and each joined to each other at its central portion by means of a central "O" ring for receiving the cross section of the central rail at a central portion thereof and by means of two half clamps vertically oriented and opened to the external side of the automotive frame, joining the first and second end of the elongated members, each having a superior and inferior bolt receiving member.

23. A vehicle frame structure according to claim 22, wherein the first and second rear axle auxiliary support each comprising a triangular frame having an horizontal side, a vertical side and an inclined side wherein the vertical side comprises a half clamp vertically oriented and opened to the internal side of the vehicle frame, each one having a superior and an inferior bolt receiving member and an opposite edge including a rear axle support element, and wherein each half clamp closes the first and second half clamps of the second transversal

support beam in such way that its bolt receiving members coincide and receive a bolt-nut assembly, thus forming and "O" shaped ring for receiving and joining the cross section of a main rail by means of an adherent substance applied to the "O" ring thus joining the first and second main rails and the central rail  
5 together.

24. A vehicle frame structure according to claim 17, wherein the third transversal support beam serves as an auxiliary gas tank support, and comprises a first and a second longitudinal and parallel elongated members each having a first and a second end and bent at its central portion forming a  
10 non-pronounced inverted "V" shaped piece, each joined at a central portion thereof by means of a central "O" ring for receiving the first end of the central rail cross section and by means of a first pair of half clamps each vertically oriented, opened to the internal side of the frame and having a superior and an inferior bolt receiving member, joining the ends of the elongated members and  
15 wherein the first and second end of the second elongated member each including a prolongation bent at an angle of 90° for joining one half clamp of a second pair of half clamps, each located below and next to one of the first pair of half clamps and each having a superior and an inferior bolt receiving member.

25. A vehicle frame structure according to claim 24, wherein each first and a second front spring support having a first end including a spring support element and a second end including a first and a second half clamp located below the first half clamp, forming a pair of half clamps, each vertically oriented, opened to the internal side of the frame and including a superior and an inferior bolt receiving member, all connected by a triangular shaped frame wherein the  
25 pair of half clamps of each spring support close a corresponding pair of half

clamps of the third transversal support beam in such way that its bolt receiving members coincide and receive a bolt-nut assembly, thus forming a first and a second "O" shaped ring for receiving and joining the cross section of a main rail and the cross section of a secondary rail by means of an adherent substance applied to each "O" ring thus joining each main and secondary rail of each double rail and both double rails together.

26. A vehicle frame structure according to claim 17, wherein the gas tank transversal support beam comprising a first and a second longitudinal and parallel elongated member, each having a first and a second end, wherein the first elongated member is bent at its central portion forming a non-pronounced inverted "V" shaped piece and the second elongated member is bent at its central portion forming a pronounced inverted "V" shaped piece, both joined by its central portion by means of two vertical and parallel elongated members each having a first end and a second end and each having a perforation (not shown) at its second end, thus forming a central "H" shaped pattern, and further including a first pair of half clamps, joined at both ends of the first longitudinal elongated member and a second pair of half clamps joined at both ends of the second longitudinal elongated member, each opened to the external side of the automotive frame.

27. A vehicle frame structure according to claim 24, wherein each 2nd<sup>t</sup> cabin support having a closed "V" shape comprised by a first and a second main elongated metallic members and a superior planar elongated member closing the "V" shape and forming a cabin support having a pallet shape including a bore in its widest portion, wherein the union of the superior planar elongated member with the first main elongated metallic member include a first

half clamp opened to an internal side of the vehicle frame and the union of the first and second main elongated members forms a second half clamp opened to the internal side of the frame, each including a superior and an inferior bolt receiving member and each closing a half clamp of the first and second pair of 5 half clamps of the gas tank transversal support beam respectively, in such way that its bolt receiving members coincide and receive a bolt-nut assembly, thus forming a first and a second "O" ring receiving and joining the cross section of a main rail and the cross section of the secondary crossbar by means of an adherent substance applied to the first and second "O" rings, thus joining the 10 main and secondary rails of each double rail and both double rails together.

28. A vehicle frame structure according to claim 17, wherein each 1<sup>st</sup> cabin support comprising a semi-solid polygonal triangular shaped piece having a first and a second lateral triangular planar member each having a width and including a vertical side having a superior and an inferior end, an horizontal side 15 having a first and a second end and an inclined side having a first and a second end, a superior elongated member joined between both lateral triangular planar members at the edges of the first end of its vertical side, forming a first and a second vertically oriented half clamp for receiving a main rail, each facing to an internal side of the frame member and having a superior and an inferior end, an 20 inferior horizontal pentagonal shaped planar member' having a circular opening in a central portion thereof, joined between both lateral triangular planar members at the edge thereof, wherein the first end of the inclined and horizontal sides coincide, a pair of rounded rail receiving sections joined to the second end of the triangular planar member vertical side for receiving and adhering to a 25 secondary rail by means of an adherent substance, a reinforcing structure

located between both lateral triangular planar members and between the superior elongated member and the inferior horizontal pentagonal shaped planar member linking them and a first and a second bolt receiving members welded to the tip of the superior end of both clamps and wherein the second 5 triangular planar member has a bore at the second end of its vertical side and a bore near the first end of its horizontal side above the rounded rail receiving sections, and wherein each triangular planar members is slightly inclined with respect to the superior elongated member and the inferior horizontal pentagonal shaped planar member towards the front of the vehicle frame.

10        29. A vehicle frame structure according to claim 28, wherein each 1<sup>st</sup> cabin support further including a sole half clamp vertically oriented, opened to the external side of the vehicle frame and having a superior bolt receiving section, said sole half clamp closing the second half clamp of the cabin support superior elongated member, in such way that its bolt receiving members 15 coincide and receive a bolt-nut assembly, thus forming an "O" ring receiving and joining the cross section of a main rail by means of an adherent substance applied to the "O" ring.

30. A vehicle frame structure according to claim 17, wherein the transmission support beam comprising an elongated channeled member having 20 an "H" shaped cross section and including a bent inverted "U" shaped central portion and two straight portions at both sides, forming the transmission support beam first and second end, each including a nut receiving perforation, and further including a first, and a second half clamp respectively, horizontally oriented and opened upward, each one joined at the first and second end and

each having a nut receiving perforation, wherein each half clamp surrounds the lower portion of a secondary rail and is linked to a 1<sup>st</sup> cabin support.

31. A vehicle frame structure according to claim 28, wherein the transmission support beam comprising an elongated channeled member having  
5 an "H" shaped cross section and including a bent inverted "U" shaped central portion and two straight portions at both sides, forming the transmission support beam first and second end, each including a nut receiving perforation, and further including a first, and a second half clamp respectively, horizontally oriented and opened upward, each one joined at the first and second end and  
10 each having a nut receiving perforation, wherein each half clamp surrounds the lower portion of a secondary rail and is linked to a 1<sup>st</sup> cabin support, by means of a nut-bolt assembly passing trough the nut receiving section and trough the perforation located at the second end of the cabin support rectangular planar member horizontal side which coincide with the nut receiving perforation.
- 15 32. A vehicle frame structure according to claim 28, wherein each cabin support linking member comprising a vertical planar member having a superior end including a vertical half clamp opened to the external side of the automotive frame having a bolt receiving member at its tip, for receiving a main rail and an inferior end including a rounded rail receiving section for receiving a secondary  
20 rail wherein each vertical planar member including a bolt receiving perforation near its second end and wherein the rounded rail receiving section having an horizontal bolt receiving member at its end and wherein the half clamp close the first cabin support half clamp in such way that both bolt receiving members coincide and receive a bolt-nut assembly thus forming an "O" ring receiving and  
25 joining the cross section of a main rail by means of an adherent substance

applied to the "O" ring, and the rounded rail receiving section is adhered to the secondary rail by means of an adherent substance.

33. A vehicle frame structure according to claim 17, further including left and right first box supports each comprising a hollow quadrangular piece having  
5 a first end having a box support member and a second end having a rounded rail receiving section facing to the internal end of the automotive frame and welded to a superior portion of a main rail between the gas tank transversal support beam and the third transversal support beam.

34. A vehicle frame structure according to claim 17, further including left  
10 and right second box supports, comprising a pair of parallel planar members having a first straight inclined side, a second side having a rounded shape and a superior horizontal side and a quadrangular horizontal planar member joined to the superior horizontal side of both parallel planar member, wherein each second side is welded to a main rail facing to the external side of the vehicle  
15 frame between the second and third transversal support beam.

35. A vehicle frame structure according to claim 17, further including left and right third box supports, each comprising a channel shaped member having an horizontal rectangular planar wall and a first and a second lateral walls depending from the vertical quadrangular member, having half of the length of  
20 the rectangular planar member and an internal and an external side and a pair of perforations at its central portion, wherein each third box support is welded to a superior portion of a main rail, between the first and second transversal support beam, and wherein the main rail remains located between the internal side of both lateral walls.

36. A vehicle frame structure according to claim 17, further including left and right fourth box supports each comprising a channel shaped member having a vertical rectangular planar wall and a first and a second lateral walls depending from the rectangular planar wall, having half of the length of the  
5 rectangular planar member and an internal and an external side, wherein each fourth box support is welded to the lateral portion of a main rail with the external side of the vertical rectangular planar member facing the external side of the vehicle frame, near the second end of a main rail, and wherein the main rail remains located between the internal side of both lateral sides.

10       37. A vehicle frame structure according to claim 17, further including a first and a second rear fender support each comprising a channel shaped piece comprising a vertical wall and two lateral horizontal walls depending from the vertical wall, said first and second rear defense supports welded to a second end tip of a main rail.

15       38. A vehicle frame structure according to claim 17, further including a left and right shock absorber support having a pyramidal shape and having a rail receiving section, wherein the left shock absorber is welded to a first main rail facing the internal side of the vehicle frame and located between the second and third transversal beams and wherein the right shock absorber is welded to  
20 a second main rail facing the internal side of the vehicle and located between the right third box support and the second transversal beam.

double rails "D", "D'"  
main rail 1, 1'  
    first end 2, 2'  
    second end 3, 3'  
    straight section 4, 4'  
    bent section 5, 5'  
secondary rail 6, 6'  
    first end 7, 7'  
    second end 8, 8'  
    first 9, 9' end bent section  
    second 10, 10' end bent sections  
    central straight section 11, 11'  
suspension support frame 12  
centrail rail 13  
    first end 14  
    second end 15  
first transversal support beam 16  
    first longitudinal elongated member 19  
    second longitudinal elongated member 20  
    first longitudinal e. m. first and second end 21, 21'  
    second longitudinal e. m. first and second end 22, 22'  
    central "O" ring 23  
    half clamps 24, 24'  
    half clamps superior bolt receiving member 25, 25'  
    half clamps inferior bolt receiving member 26, 26'  
first and a second rear spring support 27, 27'  
    spring support element 28, 28'  
    half clamp 29, 29'  
    flat elongated piece 30, 30'  
    two curved elongated pieces 31, 31', 32, 32'  
    half clamp superior bolt receiving member 33, 33'  
    half clamp inferior bolt receiving member 34, 34'  
    "O" shaped ring 35, 35'  
second transversal support beam 17  
    first longitudinal elongated member 36  
    second longitudinal elongated member 37  
    first longitudinal e. m. first and second end 38, 38'  
    second longitudinal e. m. first and second end 39, 39'  
    central "O" ring 40  
    half clamps 41, 41'  
    half clamp superior bolt receiving member 42, 42'  
    half clamp inferior bolt receiving member 43, 43'  
first and a second rear axle auxiliary support 44, 44'  
    triangular frame horizontal side 45, 45'  
    \*\*triangular frame vertical side 46, 46'\*\*  
    triangular frame inclined side 47, 47'

half clamp 48, 48'  
half clamp superior bolt receiving member 49, 49'  
half clamp inferior bolt receiving member 49b, 49b'  
rear axle support element 50, 50'  
"O" shaped ring 51, 51'  
third transversal support beam 18  
    first longitudinal elongated member 52  
    second longitudinal elongated member 53  
    first longitudinal e. m. first and second end 54, 54'  
    second longitudinal e. m. first and second end 55, 55'  
    central "O" ring 56  
    half clamps 57, 57'  
    half clamp superior bolt receiving member 58, 58'  
    \*half clamp inferior bolt receiving member 59, 59'\*  
    second longitudinal elongated member prolongations 60, 60'  
    second pair of half clamps 61, 61'  
    \*second pair half clamp superior bolt receiving member 62, 62'\*  
    second pair half clamp inferior bolt receiving member 63, 63'  
first and a second front spring support 64, 64'  
    spring support element 65, 65  
    first and second half clamps 66, 66', 67, 67'  
    first "O" shaped ring 68, 68'  
    second "O" shaped ring 69, 69'  
a gas tank transversal support beam 70  
    first longitudinal elongated member 71  
    second longitudinal elongated member 72  
    first longitudinal e. m. first and second end 73, 73'  
    second longitudinal e. m. first and second end 74, 74'  
    vertical and parallel elongated members 75, 75'  
    \*vertical and parallel elongated members perforations 76, 76'\*  
    first pair of half clamps 77, 77'  
    second pair of half clamps 78, 78'  
first and a second 2ndt cabin support 79, 79'  
    first main elongated metallic member 80, 80'  
    second main elongated metallic member 81, 81  
    superior planar elongated member 82, 82'  
    superior planar elongated member bore 83, 83'  
    first half clamp 84, 84'  
    second half clamp 85, 85'  
    first pair half clamp superior bolt receiving member 86, 86'  
    \*first pair half clamp inferior bolt receiving member 87, 87'\*  
    \*second pair half clamp superior bolt receiving member 88, 88'\*  
    second pair half clamp inferior bolt receiving member 89, 89'  
    first 90, 90' and second 90b, 90b' "O" ring  
first and second 1st cabin support 91, 91'  
    first lateral triangular planar member 92, 92'

second lateral triangular planar member 93, 93'  
superior elongated member 94, 94'  
first vertically oriented half clamp 95, 95'  
second vertically oriented half clamp 96, 96'  
inferior horizontal pentagonal shaped planar member (P.s.p.m) 97, 97'  
P. s. p. m. circular opening 98 98'  
reinforcing structure 99, 99'  
first 100, 100' bolt receiving member  
second 101, 101' bolt receiving member  
sole half clamp 102, 102'  
"O" ring 103, 103'  
transmission support beam 104  
    bent inverted "U" shaped central portion 105  
    straight portions 106, 106'  
    transmission support beam first end 107  
    transmission support beam second end 108  
    first half clamp 109  
    second half clamp 110  
first 111 and a second cabin support linking member  
    vertical planar member 112  
    vertical half clamp 113  
    vertical half clamp bolt receiving members 114, 114'  
    bolt receiving perforation 115  
    "O" ring 116, 116'  
front suspension support frame 12  
    first double rail receiving section 118  
    second double rail receiving section 118'  
    impact beam 119, 119'  
left and right first box supports 120, 120'  
    box support member 121, 121'  
left and right second box supports 122, 122'  
    quadrangular horizontal planar member 123, 123'  
left and right third box supports 124, 124'  
    pair of perforations 125, 125'  
left and right fourth box supports 126, 126'  
first and a second rear fender support 127, 127'  
left and right shock absorber support 128, 128'